Welcome to Our Kick-Off Event!!!

November 2, 2022

7:00 – 8:30PM

Arlington Community Center Main Hall / Virtual

Agenda

7:00 PM	Welcome / Introductions
7:10 PM	Overview of Electrification & Electrify Arlington
7:20 PM	Technology & Incentive Overview
7:30 PM	Partner Introductions
7:45 PM	Introducing the Electrify Arlington Coaches!
7:55 PM	Coach Testimonials
8:05 PM	Question & Answer
8:30 PM	Adjourn

Overview of Electrification & *Electrify Arlington*

Talia Fox | Sustainability Manager, Town of Arlington | tfox@town.arlington.ma.us

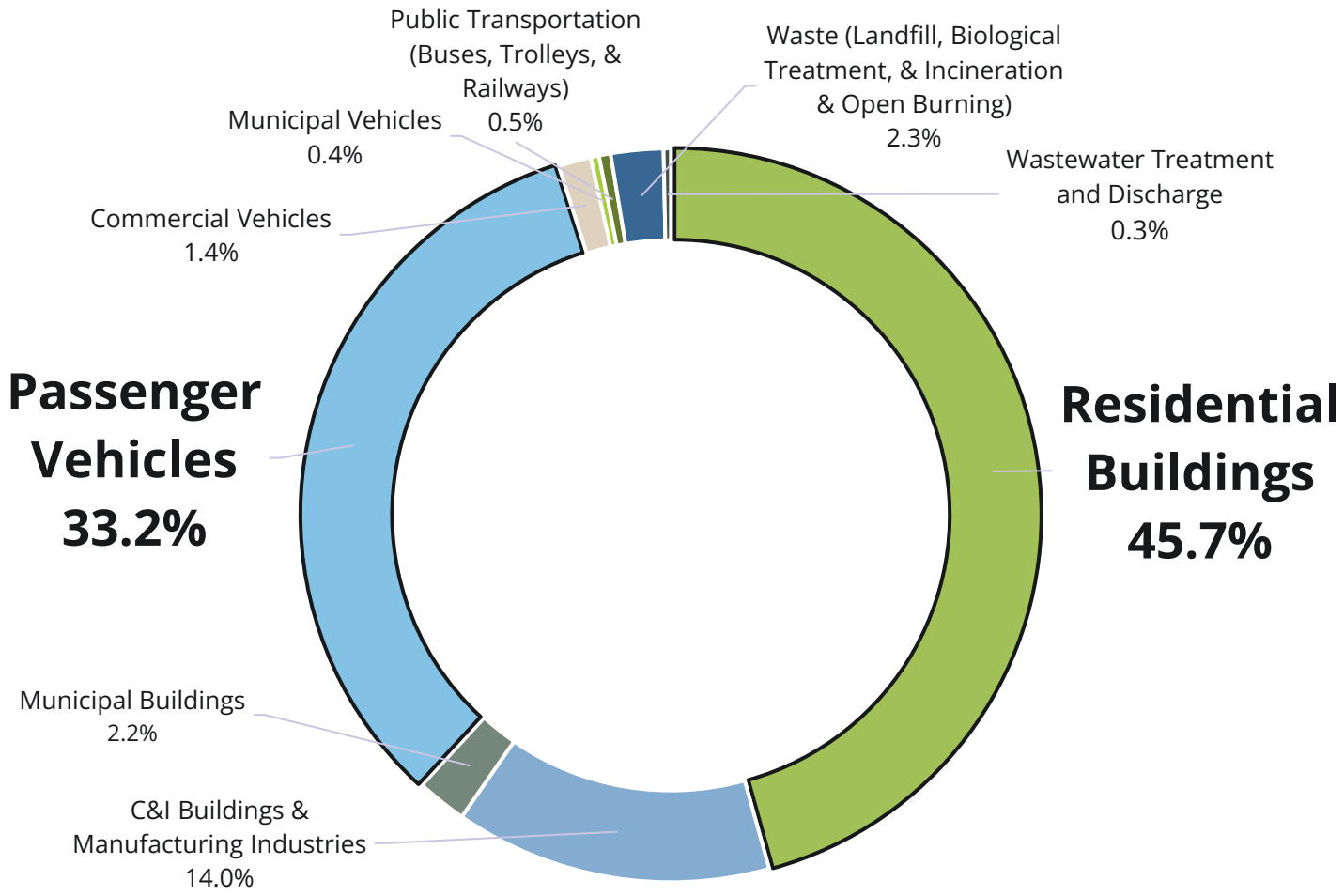
To reach our goal of net zero greenhouse gas emissions by 2050, we must power buildings and transportation in Arlington with clean electricity

Electrify Arlington is…

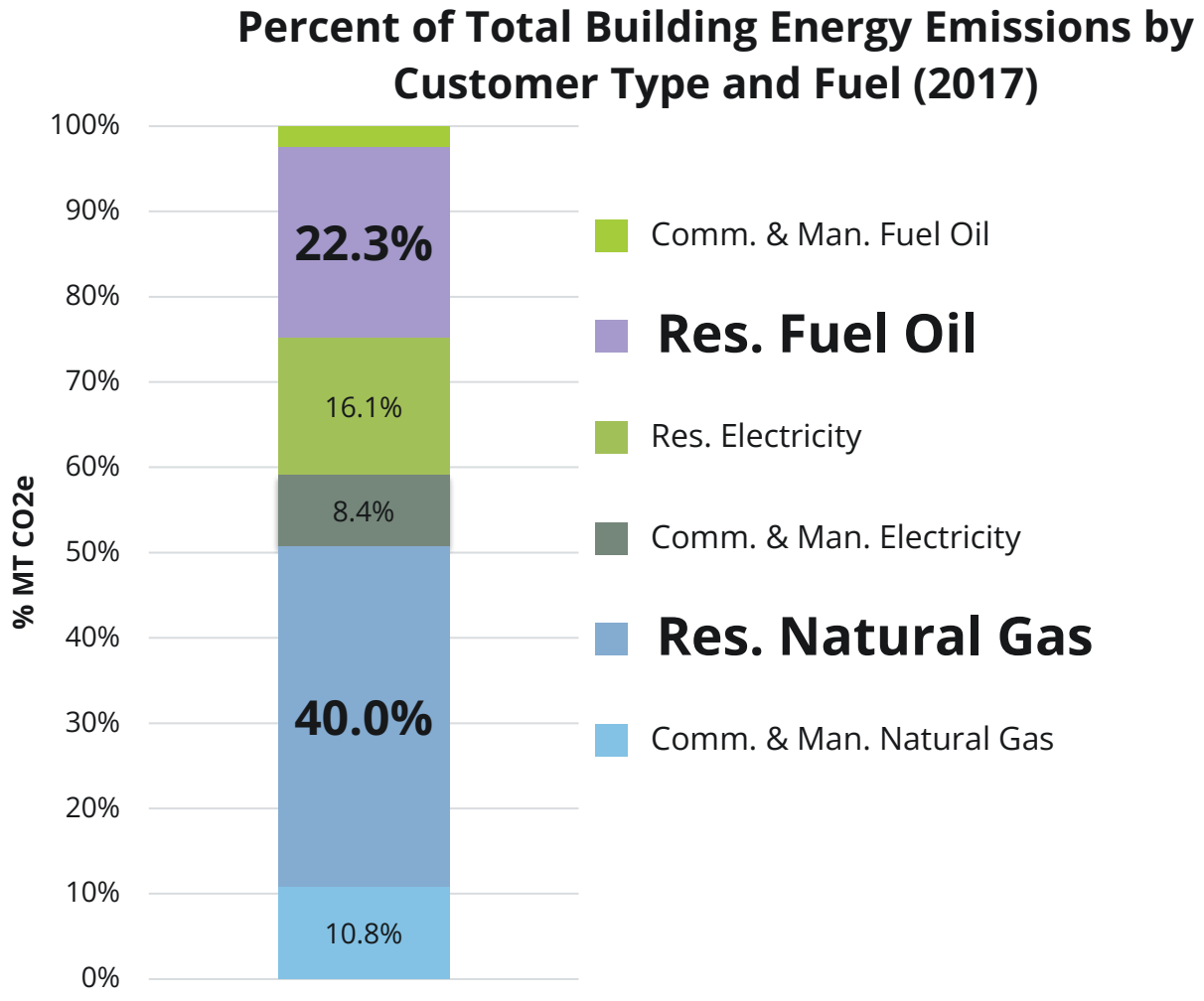
- our community's campaign to make the transition from fossil fuels to clean electricity
- led by the Clean Energy Future Committee (CEFC), community volunteers, and the Town
- a high priority initiative from the Town's Net Zero Action Plan

Nearly 80% of greenhouse gas emissions in Arlington come from residential buildings and passenger vehicles

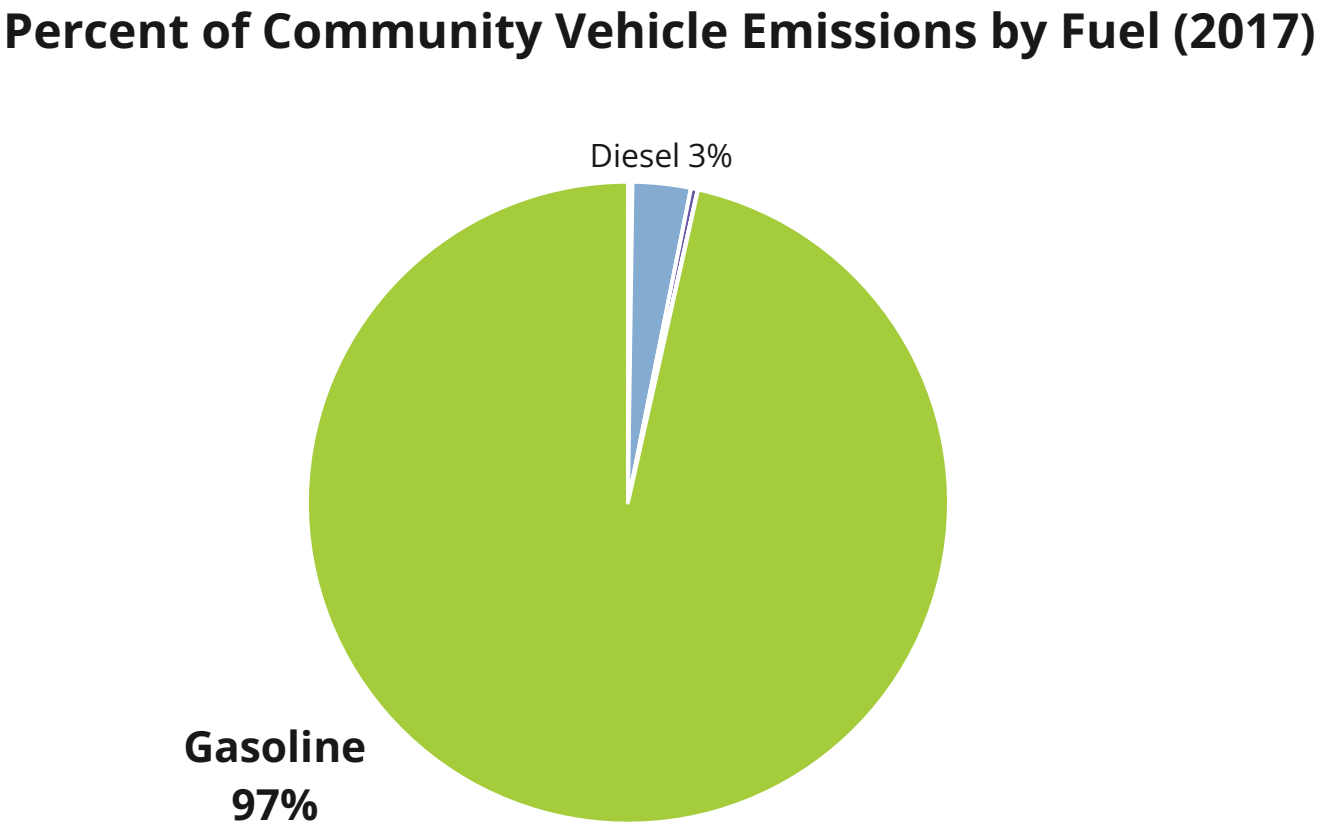
Percent of Total Community-Wide Emissions by Subsector (2017)



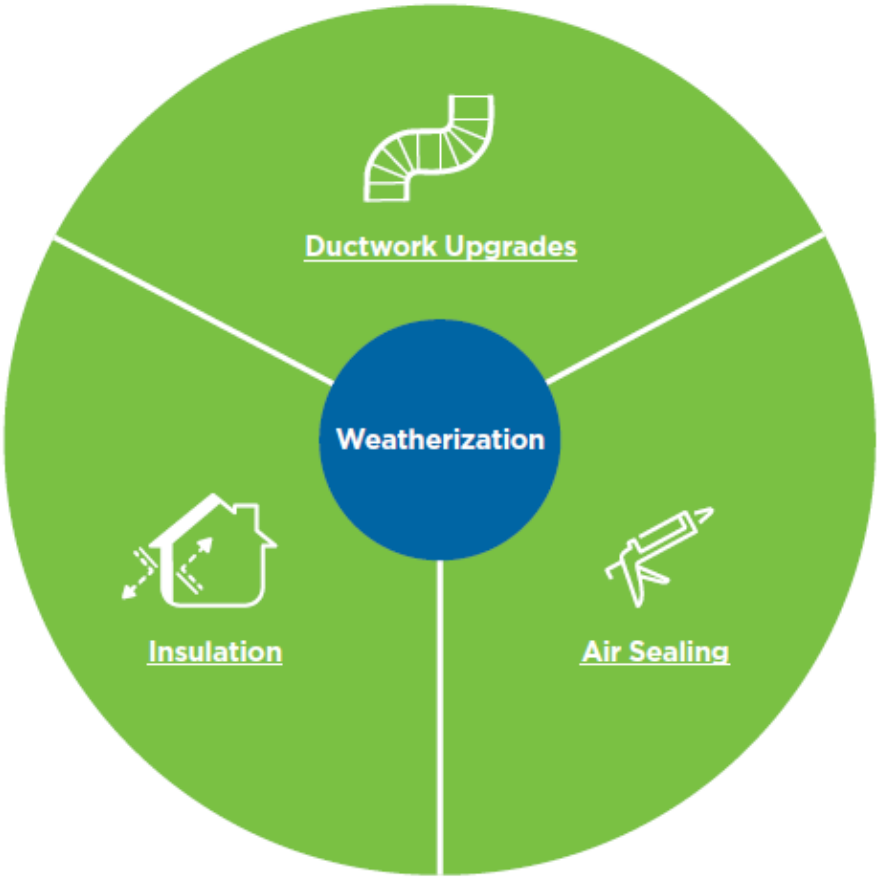
We burn natural gas and fuel oil in our homes to stay warm



We burn gasoline in most of our vehicles to get around town



We must replace fossil fuels in these sectors with cleaner energy sources, via **weatherization** and **electrification**



https://goclean.masscec.com/downloads/MassCEC-Introduction-to-the-clean-energy-home-guide.pdf

Electrification can enhance public health outcomes

Home // Local Coverage

Unburned natural gas contains 21 toxic air pollutants, study finds

June 28, 2022 | By Miriam Wasser

https://www.wbur.org/news/2022/06/28/natural-gas-health-methane-harvard-air-toxics

Scientists tested the natural gas used in kitchen stoves around Boston. They found dangerous chemicals.

By Sabrina Shankman Globe Staff, Updated June 28, 2022, 6:00 a.m. 191

https://www.bostonglobe.com/2022/06/28/science/scientists-measured-pollutants-coming-gas-stoves-boston-they-found-dangerous-chemicals/

The New York Times

Researchers Find Benzene and Other Dangers in Gas Piped to California Homes

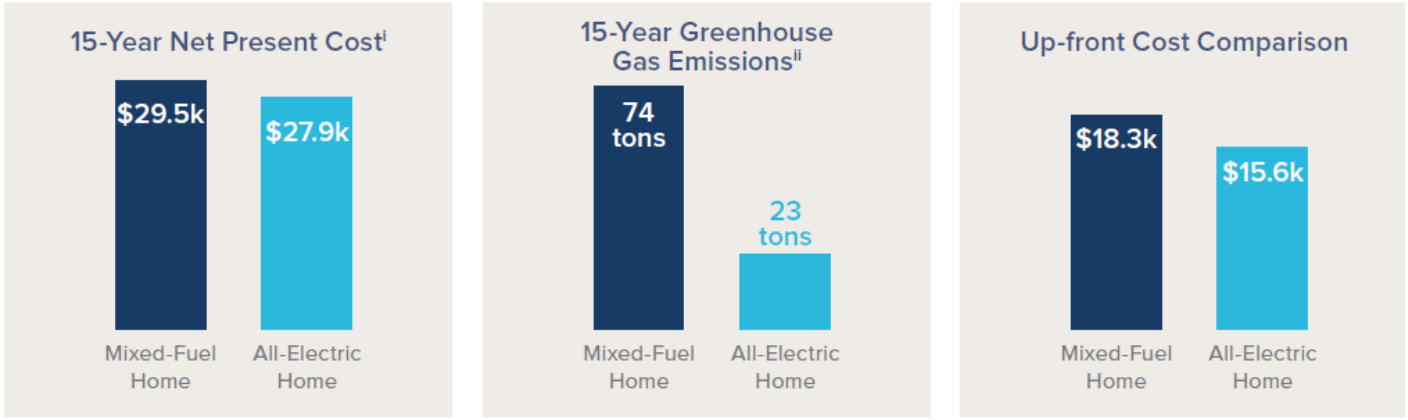
A new study estimated that each year California gas appliances and infrastructure leak the same amount of benzene as is emitted by nearly 60,000 cars.

https://www.nytimes.com/2022/10/20/climate/gas-stove-benzene-california.html?smid=em-share

Electrification plus efficiency can reduce costs

- New, all-electric homes in MA cost less to build and operate than mixed-fuel homes
- Going electric in an existing home can reduce energy loads and costs (depends on fuel costs and efficiency)
- Electric vehicles cost less to maintain and don't rely on volatile gas prices

RMI analyzed the costs of a new all-electric home versus a new mixed-fuel home that relies on gas for cooking, space heating, and water heating. **In Boston, the all-electric home saves nearly $1,600 in costs and 51 tons of CO_2 emissions over a 15-year period.**



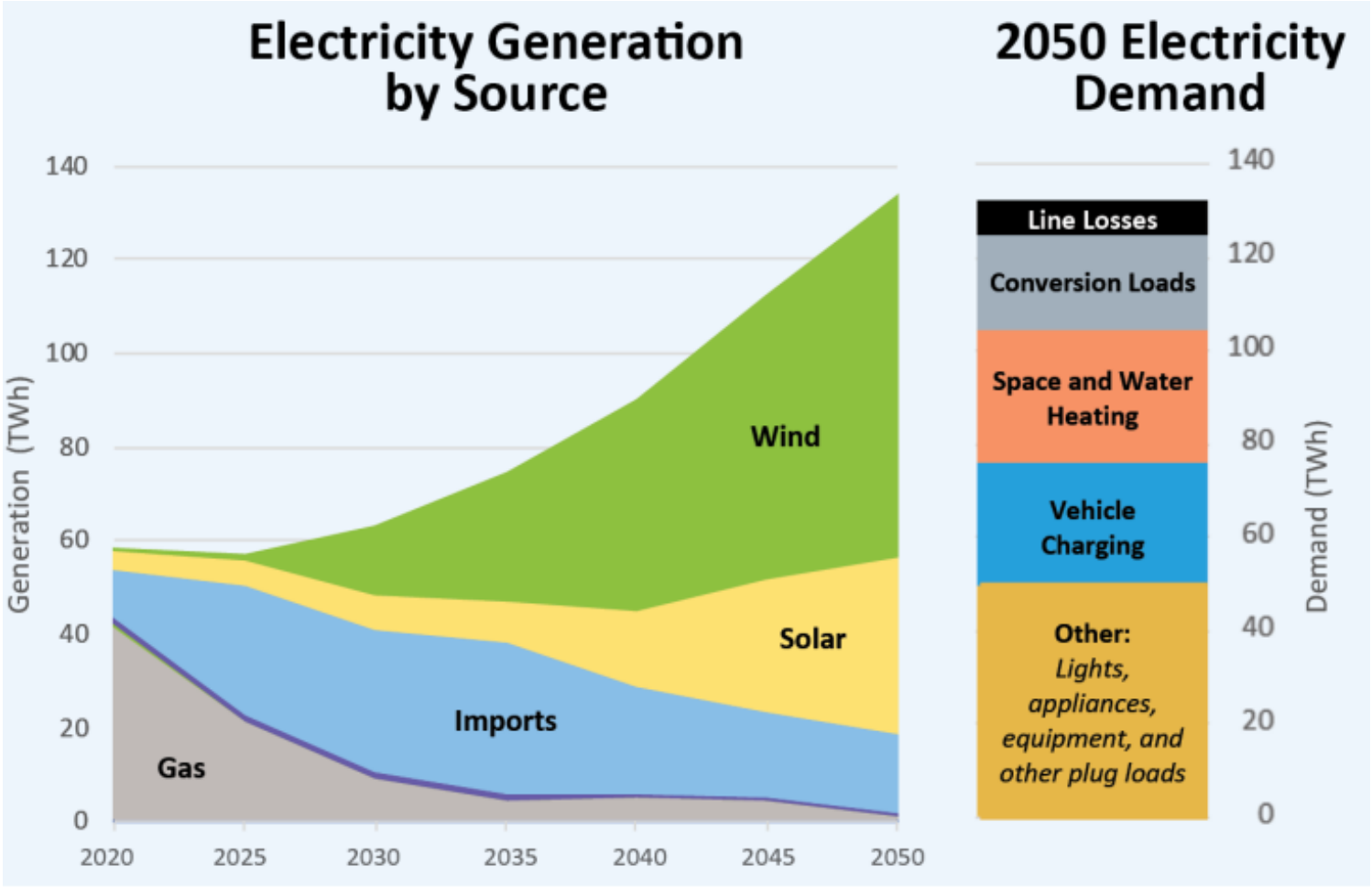
Source: RMI, 2020, https://rmi.org/insight/the-new-economics-of-electrifying-buildings?submitted=1983dhtw8ive%20Green%20Fuel%20Cost%20Comparison%20Methodology.pdf.

Making the switch from fossil fuels will help Arlington reduce our emissions, now

In the short term…

- Modern electric appliances are extremely efficient
- Air source heat pumps equal or reduce emissions compared to the most efficient gas boilers available
- Residents can choose 100% clean electricity with Arlington Community Electricity (ACE)

Making the switch to electricity sets us up for a net zero future

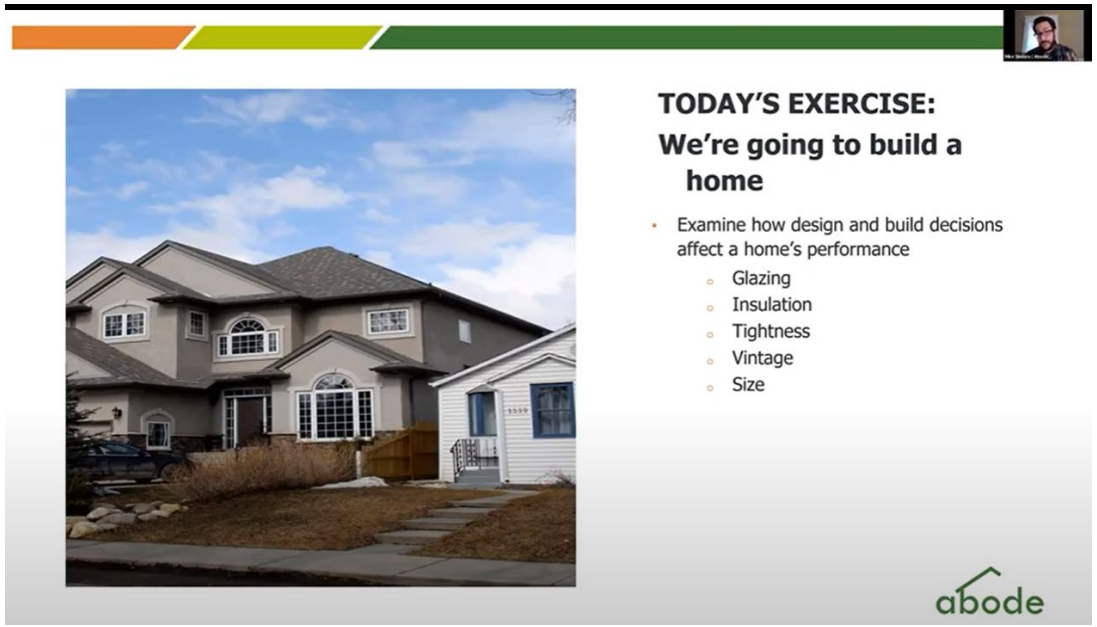


Source: Massachusetts Executive Office of Energy and Environmental Affairs, Decarbonization Roadmap, https://www.mass.gov/info-details/ma-decarbonization-roadmap

What does Electrify Arlington Offer?

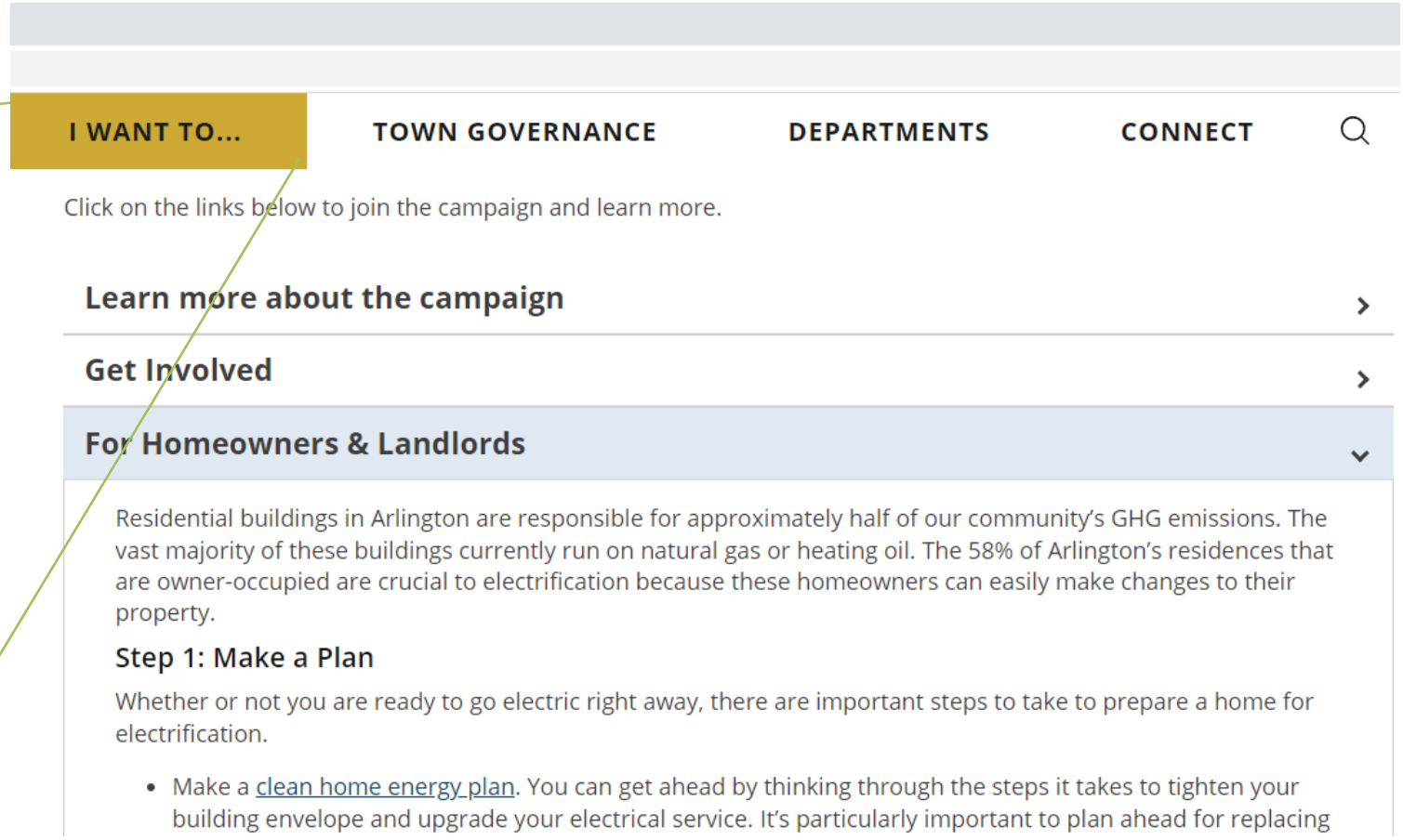
Electrify Arlington / HeatSmart Alliance coaches

No-cost consultations in partnership with Heat Smart Alliance and Abode Energy Management



Get connected with a coach by filling out our intake form: https://forms.gle/2ePE4NqXu3t141Ph8

Electrify Arlington website



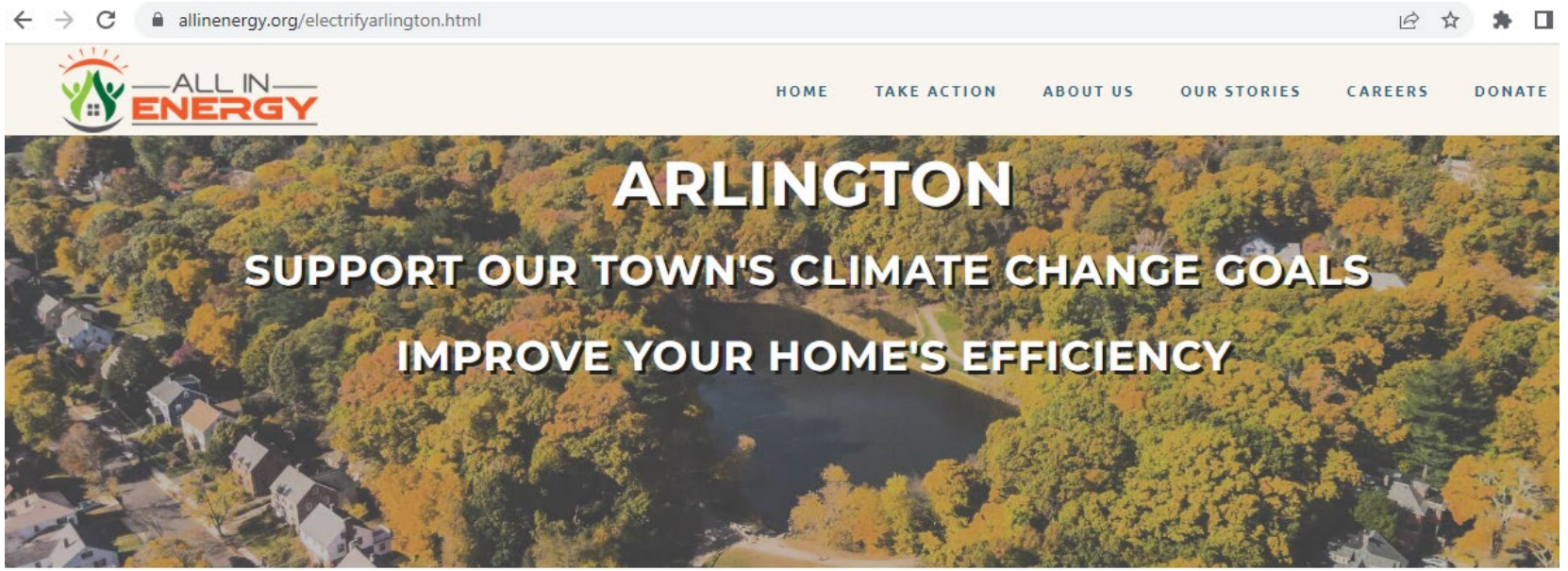
Visit arlingtonma.gov/electrify

Support scheduling energy audits

Call 781-243-5650

OR

Visit https://allinenergy.org/electrifyarlington.html



Arlington is partnered with the nonprofit All In Energy to connect **renters, landlords, and homeowners in buildings with 1-4 units** to energy-savings and renewable energy programs that can help you upgrade your apartments and buildings, reduce your energy bills, make your home healthier and more comfortable, and fight climate change. These programs are offered at low-to-no-cost.

Learn more and get connected to programs to start saving energy and money:

Mass Save® no-cost Home Energy Assessments

f you pay a utility bill, you are eligible for this Mass Save program! Whether you rent or own one unit or a whole 1-4 unit building, you can get a no-cost Home Energy Assessment.

Opportunities to learn from neighbors & experts

Workshops, events, and media will enable residents and businesses to share their experiences installing electric systems and appliances

Energy efficiency and electrification education events in partnership with community organizations

Sign up for our mailing list by filling out our intake form: https://forms.gle/2ePE4NqXu3t141Ph8

Get involved and learn more!

Fill out our intake form:
https://forms.gle/2ePE4NqXu3t141Ph8

Talia Fox | Sustainability Manager, Town of Arlington | tfox@town.arlington.ma.us

References / Useful Links!

- Slides 4-7: Arlington Net Zero Action Plan (details on GHG inventory and priority actions)
  - https://www.arlingtonma.gov/home/showpublisheddocument/55139/637885684739670000
- Slide 8: MassCEC Clean Energy Lives Here (details on technologies, how to make a plan, etc.)
  - https://goclean.masscec.com/
- Slide 9: Articles on toxins from natural gas stoves
  - https://www.wbur.org/news/2022/06/28/natural-gas-health-methane-harvard-air-toxics
  - https://www.bostonglobe.com/2022/06/28/science/scientists-measured-pollutants-coming-gas-stoves-boston-they-found-dangerous-chemicals/
  - https://www.nytimes.com/2022/10/20/climate/gas-stove-benzene-california.html?smid=em-share
- Slides 10-11: Resources on how efficiency & electrification can reduce costs and emissions
  - https://rmi.org/insight/the-new-economics-of-electrifying-buildings?submitted=1983dhtw8
  - https://www.mass.gov/service-details/how-massachusetts-households-heat-their-homes
  - https://goclean.masscec.com/benefits-savings/
  - https://e4thefuture.org/wp-content/uploads/2022/06/Residential-ccASHP-Building-Electrification_060322.pdf
- Slide 12: Massachusetts 2050 decarbonization roadmap:
  - https://www.mass.gov/info-details/ma-decarbonization-roadmap

References / Useful Links (cont'd)!

- Electrify Arlington site: https://www.arlingtonma.gov/i-want-to/go-green/electrify-arlington OR arlingtonma.gov/electrify
- Arlington "Go Green" site (for an overview of all things sustainability in town): https://www.arlingtonma.gov/i-want-to/learn-about/green-arlington
- Abode website for Electrify Arlington: https://abodeem.com/homeowners/community-programs/arlington/
- All In Energy website for Electrify Arlington: https://allinenergy.org/electrifyarlington.html
- Intake form to sign up for a coaching session, mailing list, and other offerings through Electrify Arlington: https://forms.gle/2ePE4NqXu3t141Ph8
- MassSave rebates: https://www.masssave.com/saving
- IRA (federal) rebate calculator: https://www.rewiringamerica.org/app/ira-calculator

Our Partners

Heat Smart Alliance – Andy Winslow

All In Energy – Gabe Shapiro, Jonathan Simning

Abode – Will D’Arrigo

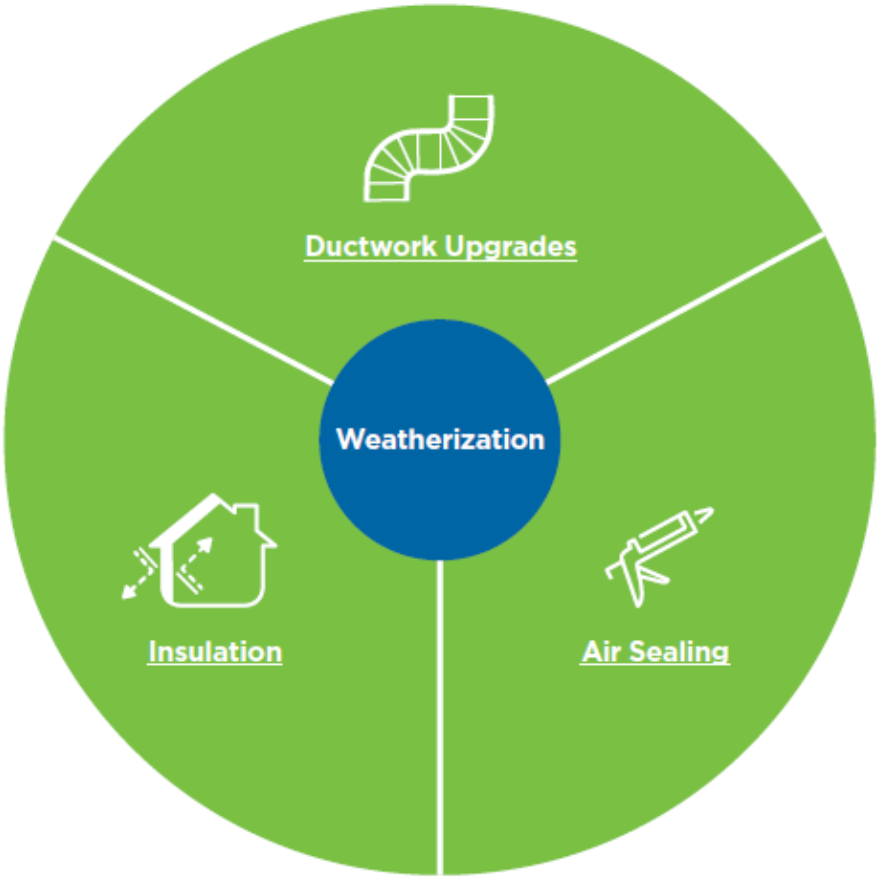
HeatSmart Alliance

Electrification Technologies & Incentives

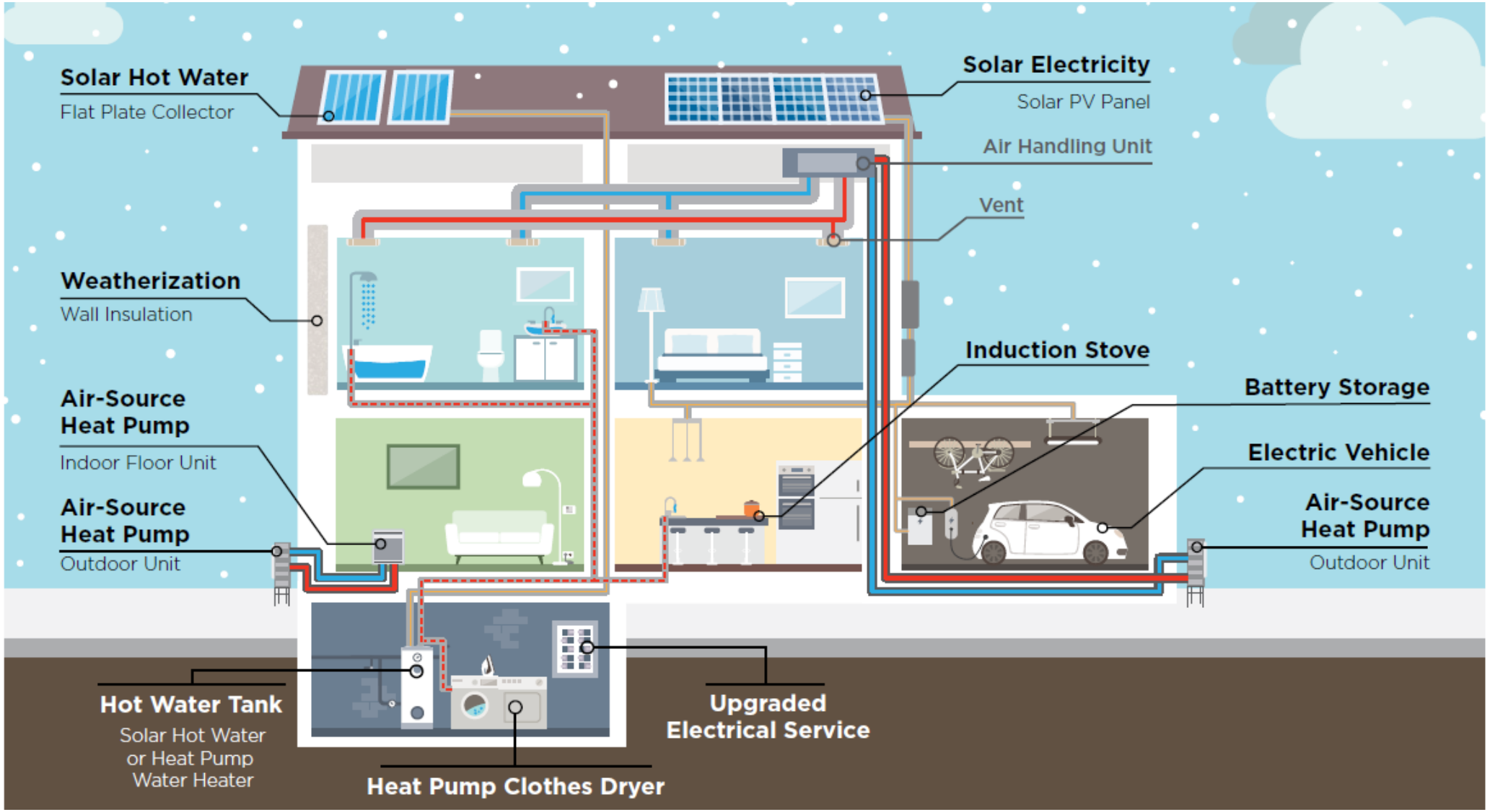
Andy Winslow
awinslow@neep.org

November 2, 2022

We must replace fossil fuels in these sectors with cleaner energy sources, via weatherization and electrification



The efficient, all-electric home!



What are home electrification technologies?

- Air source heat pump – mini-splits or ducted for heating and cooling
- Ground source heat pump for heating and cooling
- Heat pump hot water heater
- Heat pump clothes dryer
- Induction stove
- Solar for electricity or hot water

How much does it cost? It depends…

Technology	Typical cost range before incentives (estimates from MassCEC, Energy Sage)
Air source heat pumps: ductless	Ductless: $3,500-$6,000 per unit
Air source heat pumps: ducted	Ducted/central: $12,000-$20,000
Ground source heat pumps	$10,000-$30,000
Heat pump hot water heater	$2,300-$4,300
Solar hot water	$9,000-$10,000
Heat pump clothes dryer	$1,000-$1,500
Solar panels	$15,000-$20,000
Electric or PHEV vehicle	$27,000-$85,000 (average is closer to $55,000)
Induction cooktop	$400-$2,000
Panel upgrade	$2,500-$4,500

HeatSmart Alliance

Financial Incentives

Mass Save

Mass Save: Energy Efficiency

Weatherization

Home insulation	75% to 100% off insulation, plus no-cost air sealing of leaks in drafty areas of your home
Smart & Programmable Thermostats	Up to $100 rebate or instant discount

Appliances

Advanced power strips	Price discounts available
Clothes dryers	$50 rebate
Clothes washers	Must be pre-qualified through home energy assessment
Dehumidifiers	$30 rebate
Induction Stove	$500 rebate

**Eligibility varies by program – please check specific requirements*

https://www.masssave.com/

Mass Save: Heating and Cooling

Heating and Cooling

Air Source Heat Pumps	Up to $10,000 rebate
Ground Source Heat Pumps	Up to $15,000 rebate
Heat Pump Water Heaters	$750 instant rebate
Integrated Controls	Up to $1,500 rebate

Mass Save: 0% HEAT Loan

- 0% interest
- Up to $25,000
- 7-year term
- Can be used to cover multiple improvements like space heating, water heating, insulation, and other equipment upgrades.

HeatSmart Alliance

Financial Incentives

Tax Credits & Federal Incentives

Solar and Electric Vehicle Tax Credits

Solar

30% tax credit, 30% tax credit for associated electrical panel upgrade

Electric Vehicles

MOR-EV program: battery electric – $2,500; plug-in hybrid – $1,500

Federal incentive: $7,500

Additional incentives are available through the **Inflation Reduction Act (IRA)**. See calculator from Rewiring America: https://www.rewiringamerica.org/app/ira-calculator .

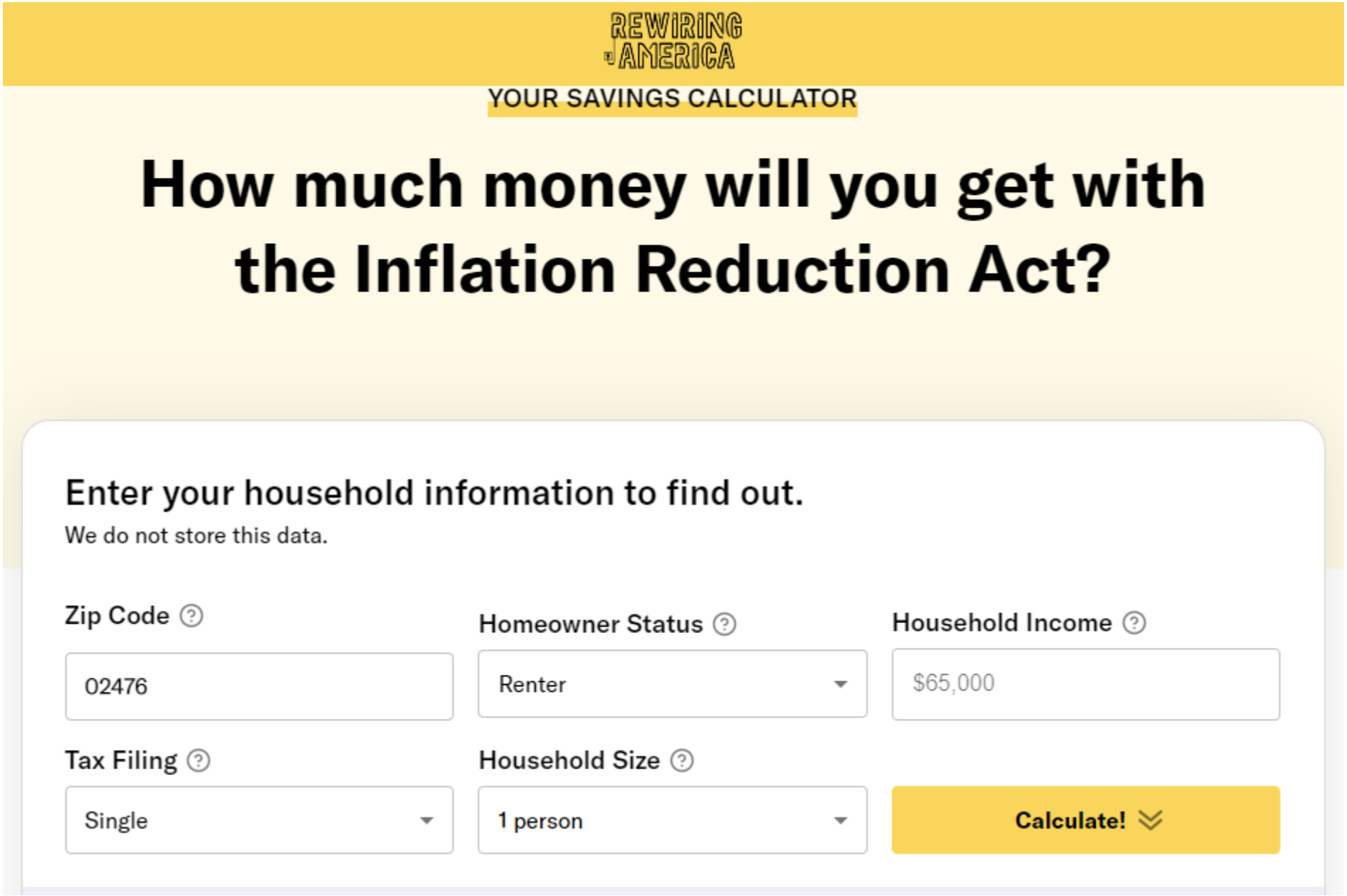
**Eligibility varies by program – please check specific requirements*

Inflation Reduction Act (IRA)

Created the incentive program: High Efficiency Electric Home Rebate Act (HEEHRA)

Rebates of $8,000 depending on income level

- Income level 80% below area median income = $8,000
- Income level 81%-150% of area median income = $4,000
- Income level >150% of area median income = 30% tax credit up to $2,000



https://www.rewiringamerica.org/app/ira-calculator

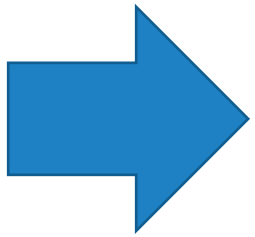
Rebate summary (see handout)

Technology/Service	MassSave (State)	Inflation Reduction Act (Federal)
Financing	0% financing through the Mass Save HEAT Loan Program	
Insulation & air sealing	No cost air sealing 75-100% off approved insulation $75 off per EnergyStar certified window	Up to $1,600 discount if income eligible 30 percent tax credit, capped per year at the following amounts: •Insulation and air sealing: $1,200 •Doors: $250 per door, $500 total •Windows: $600 •Energy audits: $150
Air source heat pumps	$10,000 rebate for whole home; $1,250 per ton for partial home Up to $15,000 if income eligible	50-100% of cost up to $8,000 if income eligible 30% tax credit up to $2,000/year

Rebate summary (see handout)

Technology/Service	MassSave (State)	Inflation Reduction Act (Federal)
Ground source heat pumps	Up to $15,000 rebate	50-100% of cost up to $8,000 if income eligible 30% tax credit
Heat pump water heaters	$750 instant rebate	Up to $1,750 discount if income eligible 30% tax credit up to $2,000/year
Electrical panel upgrade	Coming soon	Up to $600/year tax credit, 30% if installed along with rooftop solar Up to $4,000 discount if income eligible
Induction stove	$500 rebate	Up to $840 discount if income eligible

About HeatSmart Alliance



Mission:

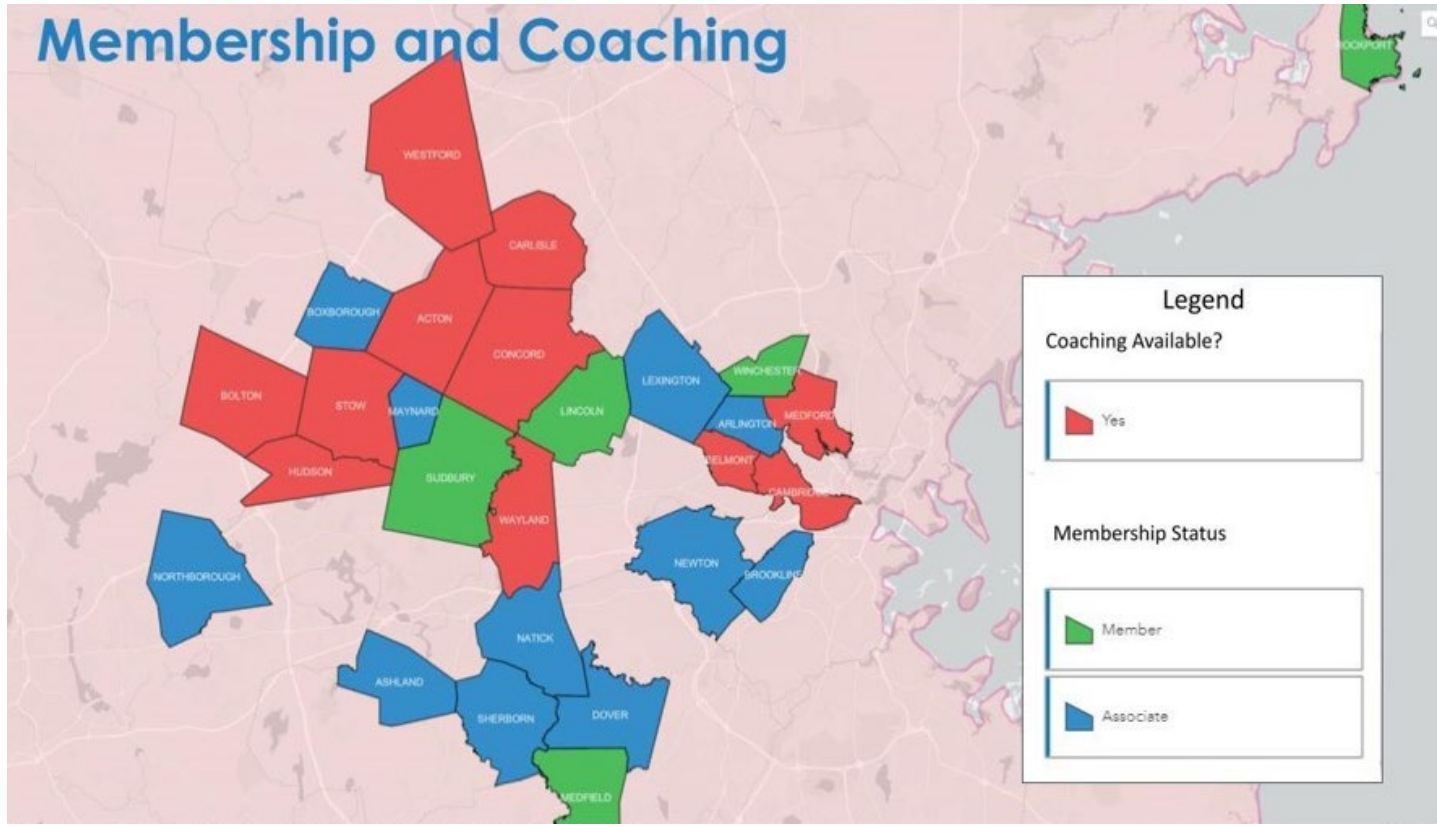
Reduce GHG emissions by accelerating adoption of energy-efficient heating and cooling systems in residences and buildings

https://heatsmartalliance.org/

HeatSmart Alliance - Overview

Accomplish Our Mission through:

- **Community Coaching**
- Policy Engagement
- Software Tool Development
- Installer Relations



Participation with Electrify Arlington

Development of Coaching tools, resources, processes, and coaching guidance

Will offer guidance to Arlington's new coaches and give them access to the HeatSmart Network

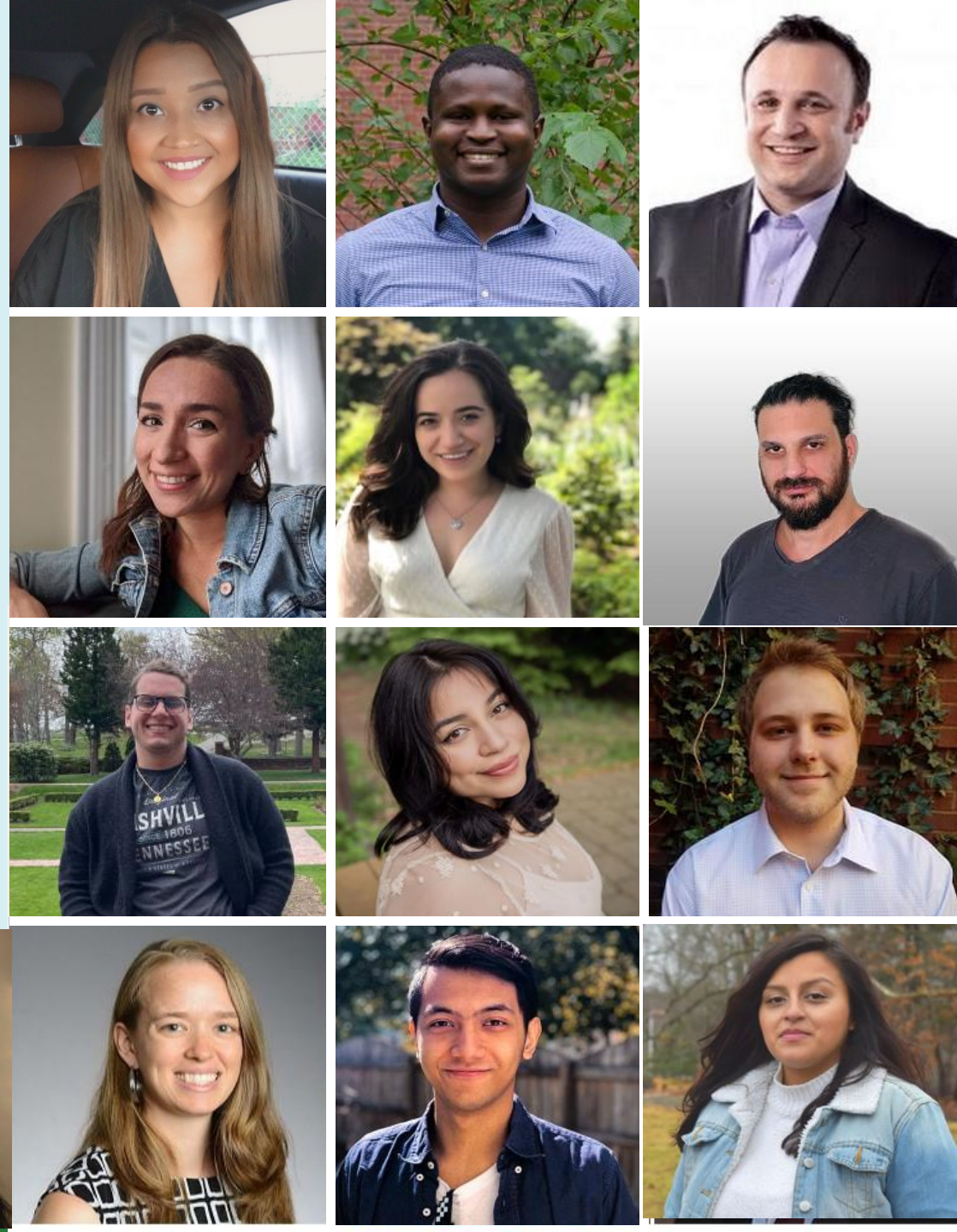
ALL IN ENERGY

Gabe Shapiro

Co-Founder & Co-Executive Director

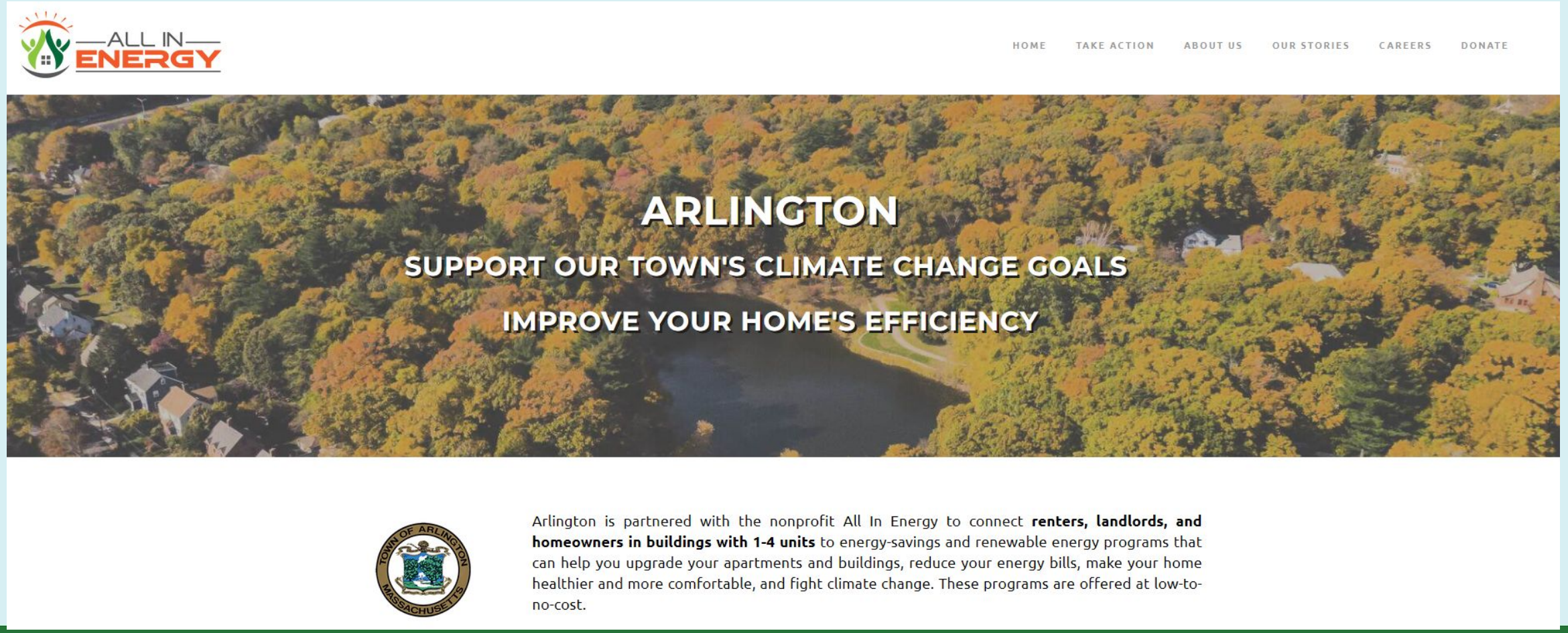
Who is All In Energy?

All In Energy is a 501(c)3 nonprofit organization with a mission to accelerate an inclusive clean energy economy

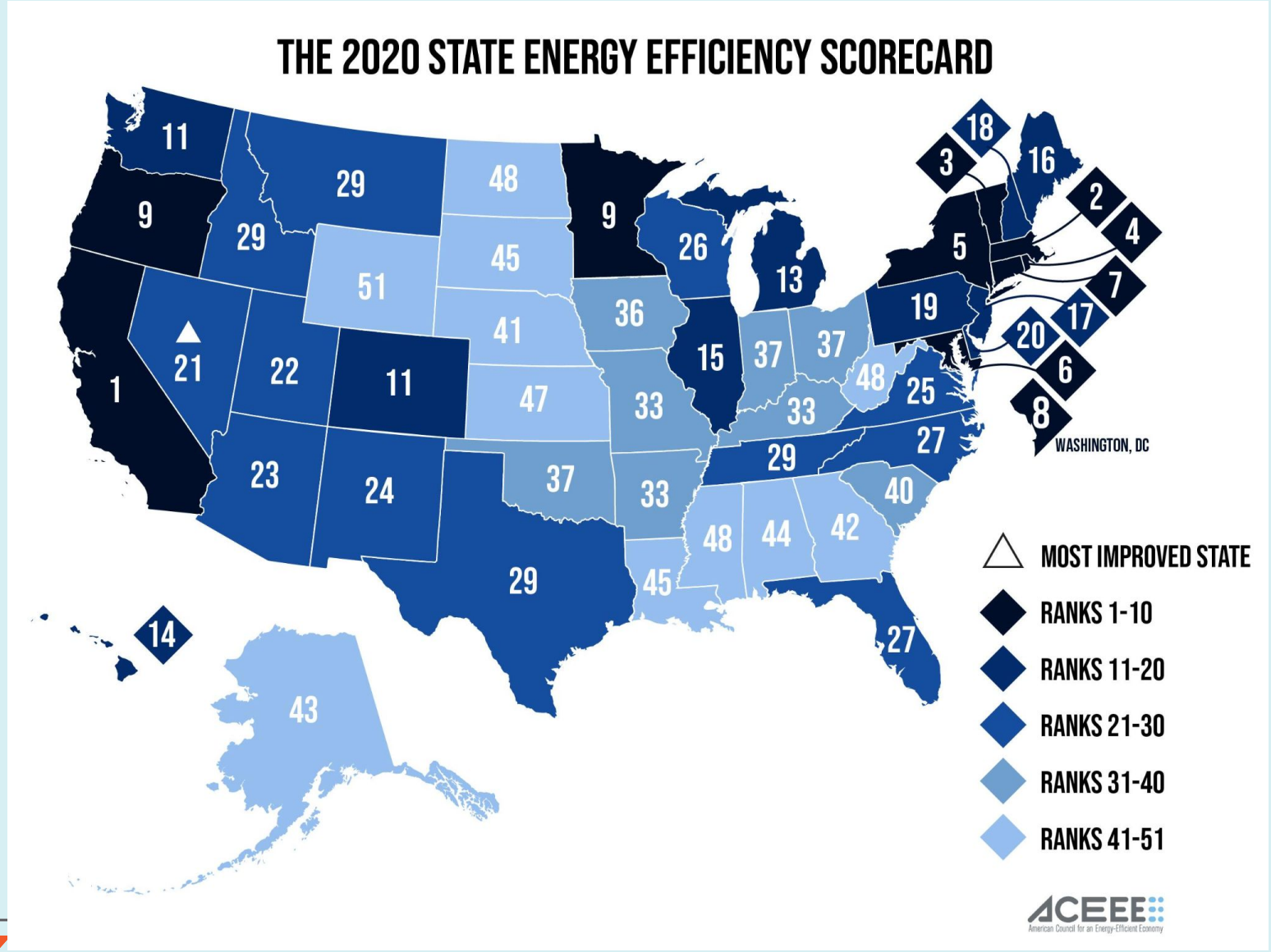


All In Energy's Role in Arlington

- Provide a dedicated phone number and website for Arlington residents
- Help residents decide if Mass Save or other Arlington supported programs is the best starting point for them
- Schedule Mass Save home energy assessments when appropriate
- Design promotional materials for emails, letters, handouts, posters, and banners.

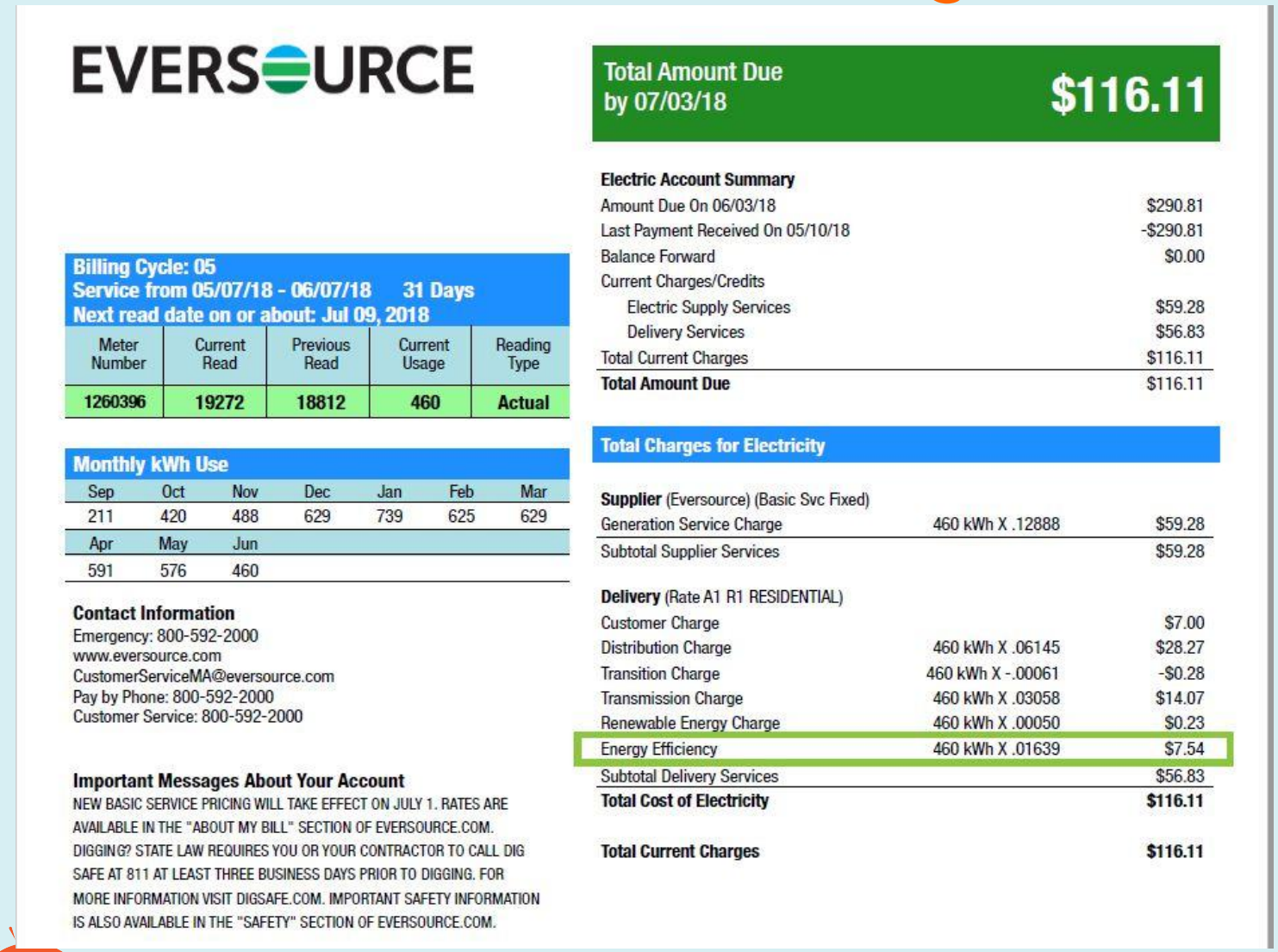


Massachusetts' Nation Leading Program



ALL IN ENERGY

You've Already Paid for Services



EVERSOURCE

Total Amount Due by 07/03/18 **$116.11**

Billing Cycle: 05
Service from 05/07/18 - 06/07/18 31 Days
Next read date on or about: Jul 09, 2018

Meter Number	Current Read	Previous Read	Current Usage	Reading Type
1260396	19272	18812	460	Actual

Monthly kWh Use

Sep	Oct	Nov	Dec	Jan	Feb	Mar
211	420	488	629	739	625	629
Apr	May	Jun				
591	576	460				

Contact Information
Emergency: 800-592-2000
www.eversource.com
CustomerServiceMA@eversource.com
Pay by Phone: 800-592-2000
Customer Service: 800-592-2000

Important Messages About Your Account
NEW BASIC SERVICE PRICING WILL TAKE EFFECT ON JULY 1. RATES ARE AVAILABLE IN THE "ABOUT MY BILL" SECTION OF EVERSOURCE.COM. DIGGING? STATE LAW REQUIRES YOU OR YOUR CONTRACTOR TO CALL DIG SAFE AT 811 AT LEAST THREE BUSINESS DAYS PRIOR TO DIGGING. FOR MORE INFORMATION VISIT DIGSAFE.COM. IMPORTANT SAFETY INFORMATION IS ALSO AVAILABLE IN THE "SAFETY" SECTION OF EVERSOURCE.COM.

Electric Account Summary

Amount Due On 06/03/18	$290.81
Last Payment Received On 05/10/18	-$290.81
Balance Forward	$0.00
Current Charges/Credits	
Electric Supply Services	$59.28
Delivery Services	$56.83
Total Current Charges	$116.11
Total Amount Due	$116.11

Total Charges for Electricity

Supplier (Eversource) (Basic Svc Fixed)		
Generation Service Charge	460 kWh X .12888	$59.28
Subtotal Supplier Services		$59.28
Delivery (Rate A1 R1 RESIDENTIAL)		
Customer Charge		$7.00
Distribution Charge	460 kWh X .06145	$28.27
Transition Charge	460 kWh X -.00061	-$0.28
Transmission Charge	460 kWh X .03058	$14.07
Renewable Energy Charge	460 kWh X .00050	$0.23
Energy Efficiency	460 kWh X .01639	$7.54
Subtotal Delivery Services		$56.83
Total Cost of Electricity		**$116.11**
Total Current Charges		**$116.11**

Please Note

- The numbers shown here are illustrative
- Gas and electric programs work the same way, although the separate charge is not shown on gas bills

ALL IN ENERGY

Mass Save Overview

Schedule a no-cost energy assessment today! Renters welcome!

Program service providers differ based on how many units in your building and income of residents, but **all programs start with a no-cost, no obligation energy assessment which can be done virtually or in-person**

Programmable thermostats

High efficiency shower heads

No cost air sealing. 75-100%* off approved insulation

Efficient heating/ cooling equipment and appliances

***All renter-occupied units in buildings of ≤4 units, units in 2-4 unit buildings, and moderate income households**

Energy Bill Check Up

- **Take control of your energy bills, assess which programs are best for you, and help you get started.**
- **Programs include:**
  - Reduced gas and electric rates
  - Utility bill assistance
  - Repayment and forgiveness programs
  - 3rd party energy suppliers
  - Energy efficiency, and more!

Take Action:
Schedule a No-Cost Home Energy Assessment

Schedule with us to speak with an energy auditor: **Call 781-316-3428**
Or visit: https://allinenergy.org/electrifyarlington.html

- Eligible instant saving measures are mailed at no cost to you!
  - On average, we've seen that these have a value of about $175 and can save around $190 on your electric bill annually!
- 75 - 100%* off approved insulation
- $16,000 rebate for incentives on heat pumps for heating and cooling

*for 2-4 unit buildings, any type of renter occupied unit, and moderate income households

November 2, 2022

Arlington/Abode Partnership

abode energy management

1% FOR THE PLANET – MEMBER –

LOCAL BUILDING SCIENCE & DECARBONIZATION EXPERTS FACILITATING CONTRACTOR AND CUSTOMER SUCCESS

UTILITY EFFICIENCY PROGRAMS

Mass Save Home Performance Contractor Lead Vendor - National Grid & Eversource

- Trade ally management
- Over 100K home energy assessments
- Over 30K weatherization installations
- Over 15K quality assurance (QA) inspections

Municipal Light Plant Weatherization Quality Assurance

- Trade ally management
- Virtual and in-home QA inspections

ELECTRIFICATION & DECARBONIZATION

MassCEC Decarbonization Pathways

- Technical lead consultant
- Implementation for single-family and triple-decker pilot

Energize CT Heat Pump Support

- Statewide customer consultation services
- Heat pump installer network (HPIN) management

Municipal Light Plants & Community Heat Pump Support

- 18 communities
- 3500+ consultations
- 2200+ heat pumps installed in MLPs

Sustainable Essex Alliance (New Jersey)

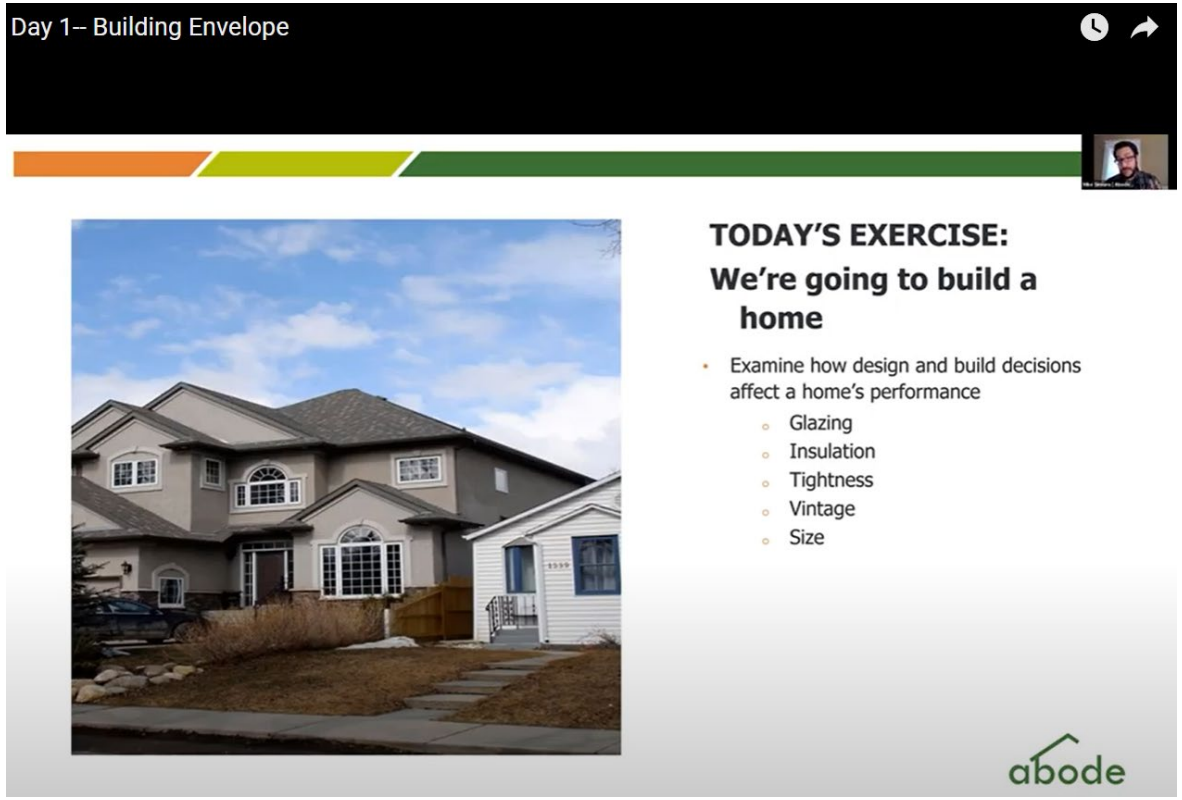
- 60+ virtual decarbonization opportunity assessments

mass save® Savings through energy efficiency

energize CONNECTICUT℠

MASSACHUSETTS CLEAN ENERGY CENTER

VOLUNTEER COACH TRAINING



Abode Decarbonization Specialist

RESOURCES FOR CLEAN HEATING & COOLING

ARLINGTON
MASSACHUSETTS

ELECTRIFY ARLINGTON

The Town of Arlington has partnered with Abode to help residents transition to clean heating technologies.

CLEAN HEATING TECHNOLOGIES

AIR SOURCE HEAT PUMPS (ASHP)

Air source heat pumps (often referred to as ductless mini-splits) are a clean technology you can use to both heat and cool your home. There are a number of economic, environmental and health benefits associated with installing air source heat pumps.

LEARN MORE

HEAT PUMP WATER HEATERS

A heat pump water heater is powered by electricity to heat water for use with faucets, showers, and appliances. The heat pump unit pulls in air from the surrounding space, extracting heat from the air and using the refrigerant cycle to heat the water.

LEARN MORE

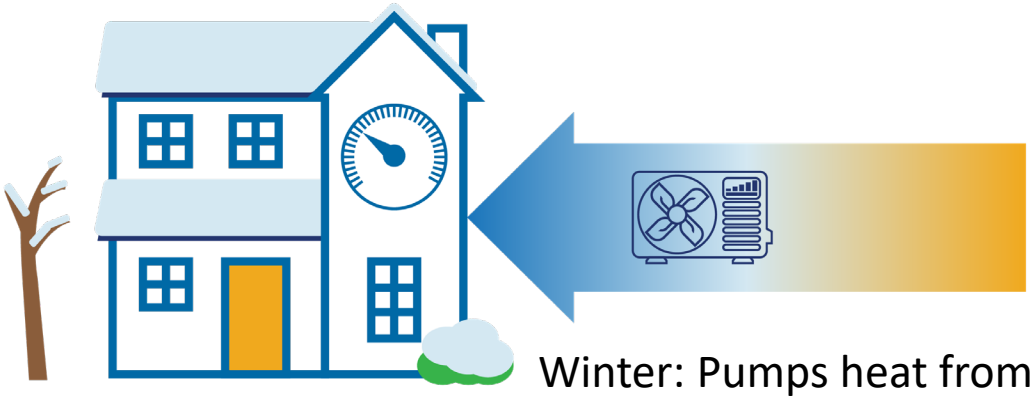
SOLAR THERMAL SYSTEMS

Solar thermal, also known as solar hot water, similarly collects solar energy using roof-mounted panels or tubes, but rather than converting that energy into electricity as with solar PV systems, solar thermal systems store the energy in water, heating it.

LEARN MORE

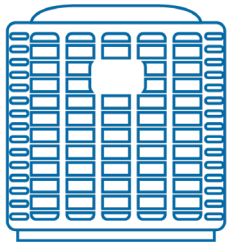
What is a heat pump?

Summer: Pumps heat from the inside to the outside

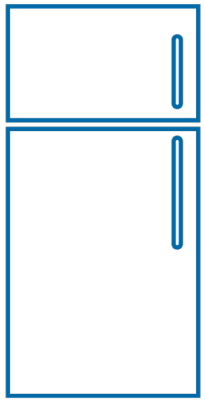


Winter: Pumps heat from the outside to the inside

Same technology as:



Air Conditioner

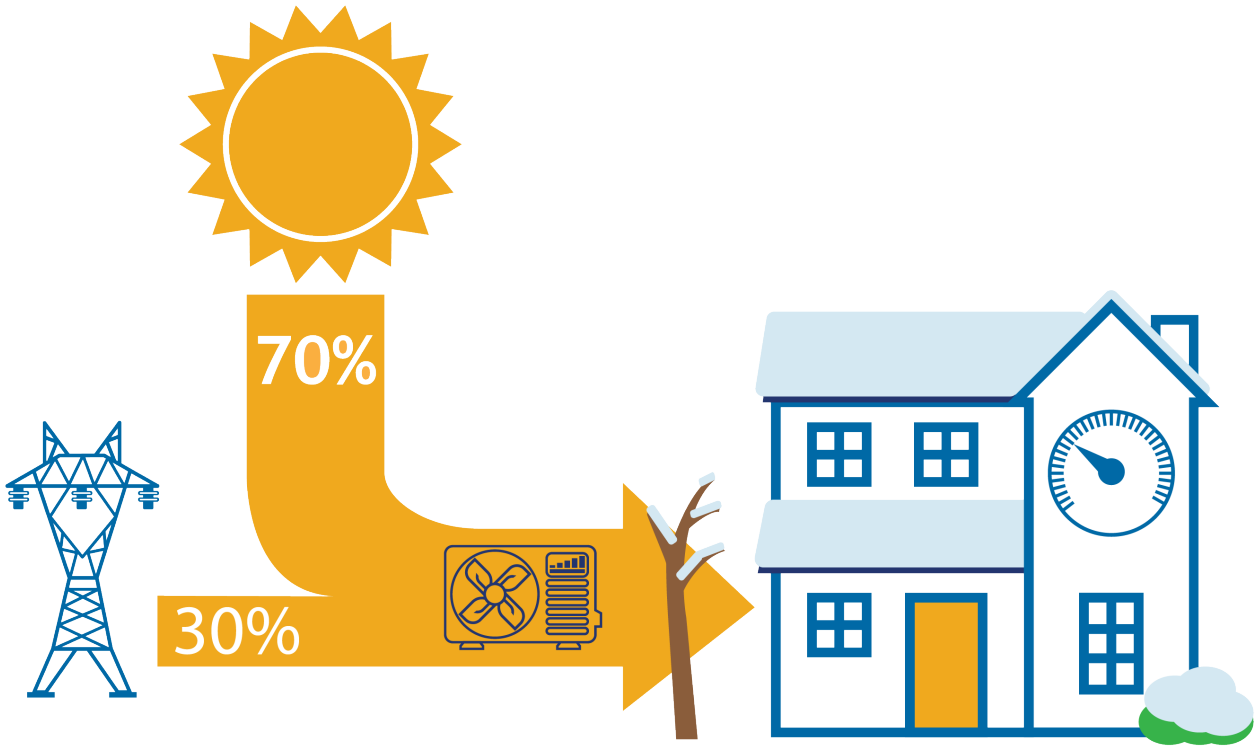


Refrigerator

Heat Pumps Do Not Generate Heat, They **Move** It

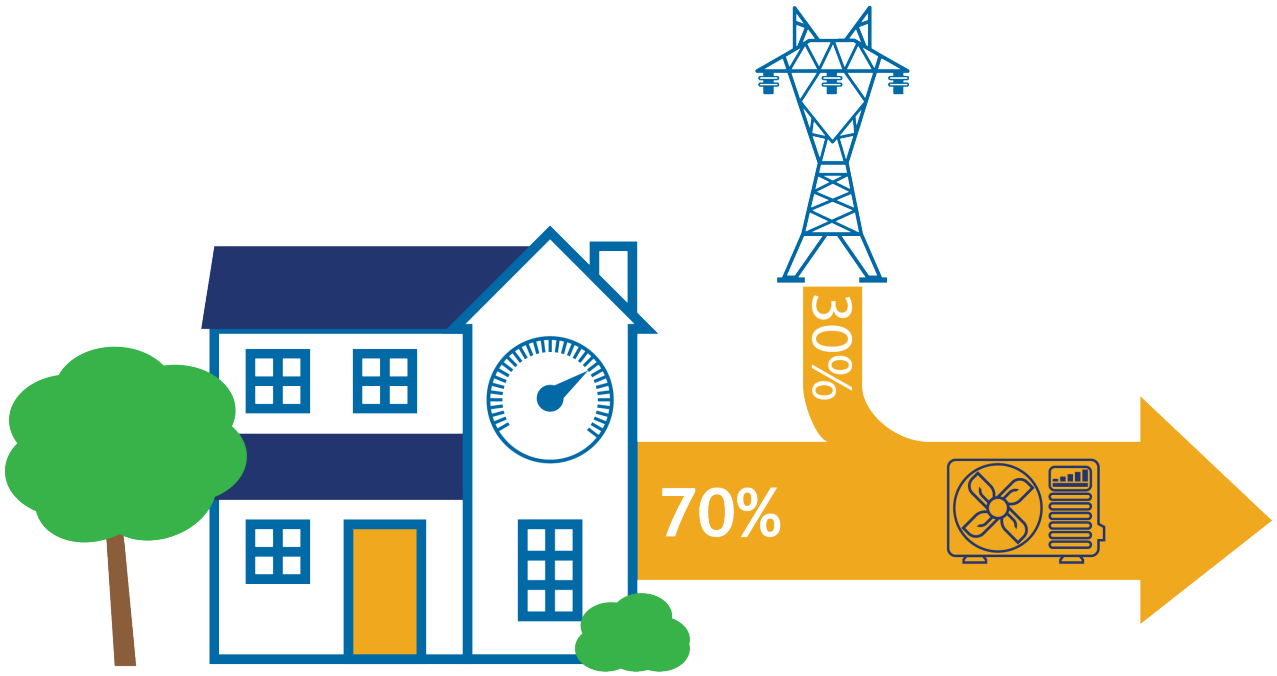
Where does the heat come from?

Heating mode: From the outside air, heated by the sun. Even when it is cold outside.



Where does the heat come from?

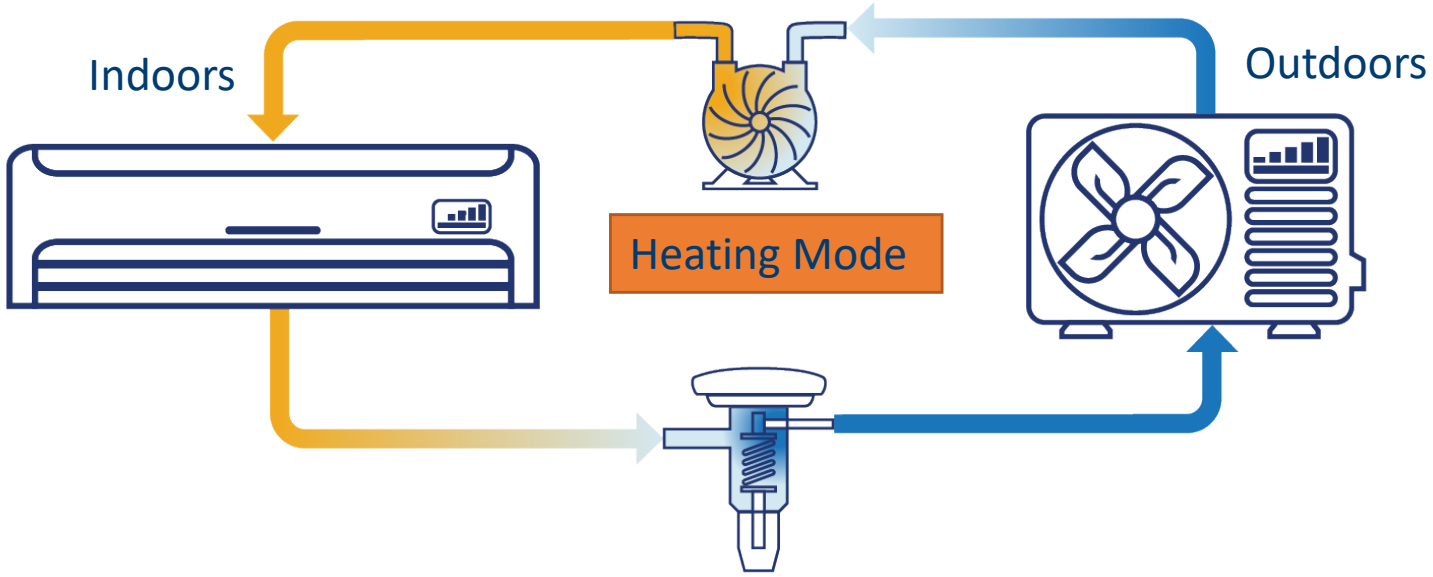
Cooling mode: From the inside air. It is not bringing in cold, it is removing (pumping) heat.



How do heat pumps work?

Vapor Compression Cycle

- Pumped refrigerant
- Pressurized (liquid) **delivers** heat
- Depressurized (gas) **collects** heat



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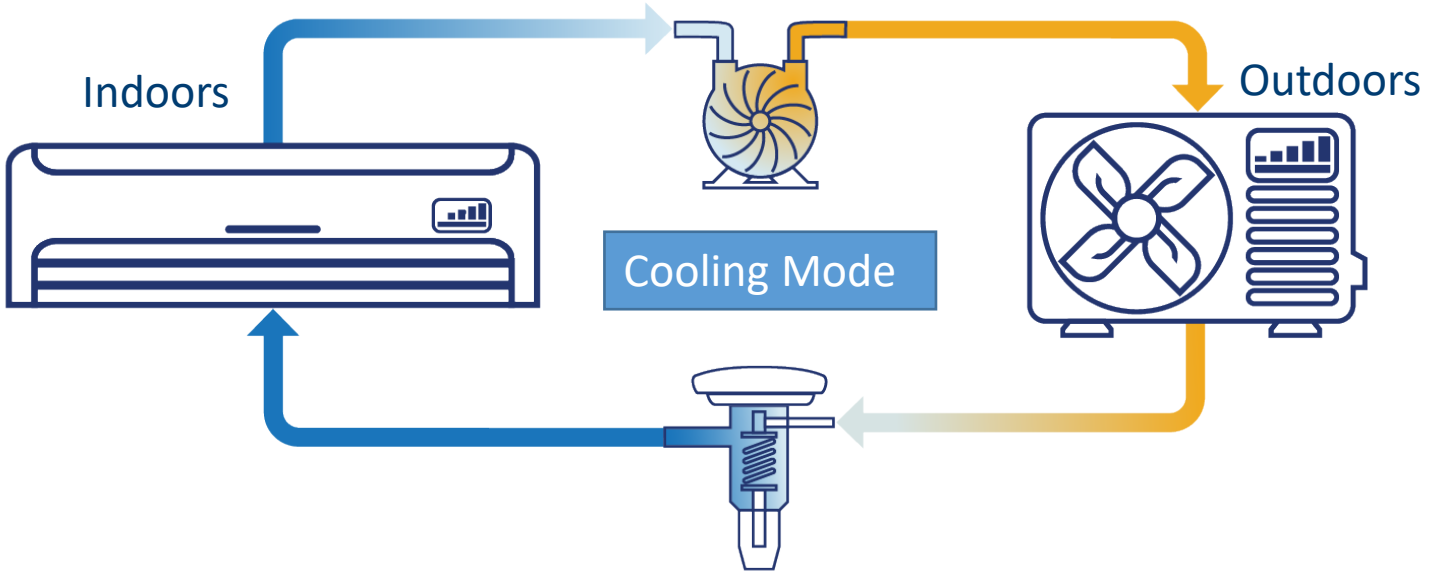
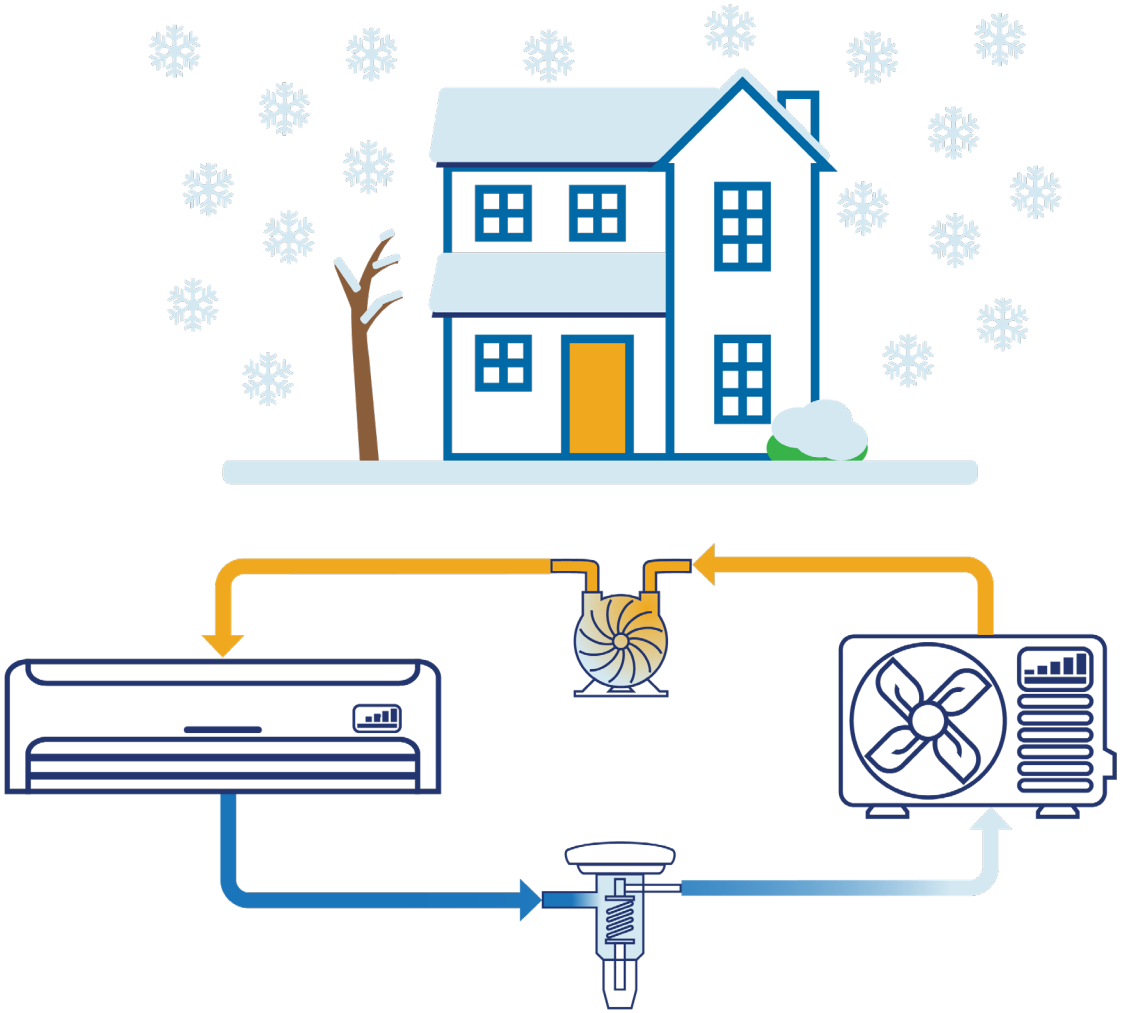
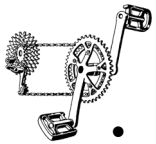


Cold Climate Air Source Heat Pumps



- Specially tuned to do well in cold climates
- Meets efficiency and capacity criteria set forth by the Northeast Energy Efficiency Partnership (NEEP)
- Improved components combine to provide *variable* speeds
  - Standard heat pumps are single-speed or two-speed only
  - Akin to a fixed speed bike vs. a 21-gear bike



Introducing the Electrify Arlington Coaches!

Lori Kenschaft, Sanjay Newton, Brian Cali, Marc Breslow

Coaching Process

1. **Prepare for Coaching Sessions**
   - Fill out Homeowners Questionnaire and Liability Waiver
   - Have or schedule a MassSave energy audit (All In Energy)

2. **Consult with Your Coach**
   - Virtually or in person, as you and your coach prefer
   - Coach also available by email for questions

3. **Obtain and Review Three Quotes**
   - Research contractors
   - Email quotes to your coach
   - Meet virtually or in person

Coach Testimonials

SANJAY'S ELECTRIFICATION JOURNEY (SO FAR)

heat pump heating and cooling
(1700 sqft, single family)

Cargo E-bike
(600 miles per year)

BEGINNINGS - MOTIVATION: SAVING ENERGY AND MONEY

Home insulation and air-sealing

Hybrid car

RECENTLY - MOTIVATION: REDUCE FOSSIL FUEL USAGE

Arlington Community Electric 100% Opt-Up

Heat Pumps to replace gas boiler and window ACs

E-bike to drastically reduce short car trips

FUTURE STEPS - MOTIVATION: ELIMINATE FOSSIL FUEL USAGE

Hot Water Heater

Clothes Dryer

Gas Stove

Remaining Transportation

KEY LEARNINGS – MAKE A PLAN

Know when your appliances/systems are likely to need replacement

Take advantage of knowledge/resources (like Electrify Arlington!)

Consider how this integrates with other goals

How we accidentally found our way to fully electrifying our home (and most of our transportation)… you are already ahead by being here!

1911 Dutch Colonial
1600→2800 sf living space
4BR, 3.5BA

- **Wall insulation/air sealing round 1—replaced single pane windows,** renovated a bathroom **(2004**)
- Finish basement, **air seal rim joists, replaced gas boiler with HE boiler (2008)**
- Finish attic (1 BR, bath), **air sealed/ insulated attic, *ducted air conditioning to 2nd/3rd floors (almost didn't do that…), 200 amp service (2012)***
- **Prius, and Nest thermostats**
- **EV (Nissan Leaf)**
- **Solar**

- **EV replacement (Bolt--more range)**
- **100% Green Electricity**
- **Prius→Rav4 PHEV**
- **Heat pump hot water heater *(hadn't prepared my family or my electrician*)** when gas heater failed (Summer 2020)
- **Induction Stove** when gas stove was failing (Spring 2021)
- **Heat pump round 1 (ducted and *1 wall mini-split*)** to reduce gas boiler use (November 2021)
- **Heat pump round 2 (1 floor mount, 1 wall mount):** turned off gas boiler (January 2022!!)
- **Canceled National Grid account (May 2022!)**

Motivations (2004-2018)

- More comfortable
- Save $ on heating
- Reduce fossil fuel use

Motivations (2019-Today)

- Eliminate fossil fuels from operations
- Insulate ourselves from energy price shocks
- Back to comfort

Lessons Learned/Surprises

- Having a plan/priorities matters: keep costs down, shorten timelines, increase satisfaction
- Today's rebates, financing, and tax incentives are significant
- Don't need to throw out fossil fuel appliances today, but when they need to go, want to be prepared
- Airsealing matters
- Heat pump hot water heaters in unconditioned basements don't work well
- EVs are fun to drive, less maintenance than ICE cars, and range anxiety is much less of an issue than before
- Heat pumps are comfortable!

Units do not have to be on the wall!

Q & A